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Contract W-7406 eng-39

Metallurgical Project

A. H. Compton, Project Director

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Per Letter Instructions Of

AEC 4-21-54

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5/17/54 SUPERVISOR LABORATORY RECORDS
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PARTIAL
COPYMONTHLY REPORT FOR THE PERIOD ENDING DECEMBER 31, 1944

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Physics Section I

Total technical personnel (including supervision)..... 18 (this period)

Problem Assignment Number	Subject	Status	Percentage of Section Manpower	
			Report Per.	Next Per.
131-X21P	Bismuth Foils	Active	7	6
105-X24P	Cl ⁴	Active	10	8
307-X29P	Neutron Diffraction	Active	17	13
307-X31P	H ³	Active	6	0
105-X34P	Be ¹⁰	Inactive	0	2
105-X35P	Xe ¹³⁵	Inactive	0	2
303-X35P	Water Lattices	Active	17	13
108-X36P	Pile Modulation	Active	0	2
103-X37P	Temperature Coefficient	Active	6	3
106-X38P	Neutron Distribution	Inactive	0	2
163-X39P	Service Flux Measure- ments	Active	6	8
105-X40P	Fast Neutron Yields	Active	6	3
104-X42P	Negative Pile Periods	Inactive	0	6
307-X45P	Gammas of La ¹⁴⁰ , Ta ¹⁸² , Sb ¹²⁴	Active	10	10
Total.....			100	100

105-X24P - C¹⁴ Production - (Meiners, Norris, Snell)

The C¹⁴ factory as described in last month's report was inserted in hole 16 of the pile, and it was filled with pure water for purposes of preliminary tests. The circulating and safety systems worked well, with the exception that the dumping (which is designed to take place if circulation fails or temperatures gets too high) was incomplete; much of the liquid remained in the tube in the pile. In addition, the neutron absorption due to the water was higher than expected; it amounted to about 100 inhours. These two factors seemed to make it desirable to redesign the tube in hole 16, and it was pulled out and replaced. The new tube is a \cup of two W tubes side by side in a 4" safety tube. At the north end (i.e. the entrance and exit end) one branch of the \cup is above the other, while at the south end the bend of the \cup lies in a horizontal plane. Thus the lower north end is a definite low point of the system, and drainage will be complete if done from this point. We are indebted to Mr. Borst for the suggestion of this design. The volume of this system is about 1/3 of that of the old tube.

This new factory has just been installed. Filling it with tap water caused a loss of 45 inhours in the reactivity of the pile. The addition of ammonium nitrate to make a saturated solution at 20°C will about double this. At the moment of writing it appears that there is not sufficient excess reactivity available in the pile to carry this load. A further loading of at least 3 tons of metal or about 45 stringers is required to permit the manufacture of the C¹⁴ to the full capacity of our factory, with a small margin of excess k for operational exigencies. No C¹⁴ at all can be made until at least some new metal is loaded.

105-X22P - Search for U²³⁶ - (Borst, Curtiss, Jenks)

A sample of ordinary uranium irradiated and concentrated by a Szilard-Chalmers process by Jenks was examined at the National Bureau of Standards in an apparatus for measuring the distribution of the ranges of the alpha particles. Unfortunately this sample contained a large amount of ordinary uranium as the result of incomplete separation. However, a comparison of the alpha ray curve for this sample with that of uranium which had not been irradiated reveals a small percentage of alpha rays at a range of approximately 2.8 cm, which is not present in the ordinary material used as a control. This result indicates that it is advisable to continue these experiments with improved technique to establish definitely the reality of this alpha ray group and determine its range.

307-X31P - Production of Tritium - (Borst, Osborne)

Studies on the recovery of tritium from a Li-Pb alloy have been terminated. At the time the work was dropped, we had succeeded only in recovering a small percentage of the tritium produced in the slug. About 0.1 cc of pure hydrogen gas was obtained containing approximately 20% H³. The amount estimated to have been formed was 0.8 cc. The gas was recovered during the heating of the slug between 500 and 600° C. No appreciable amount was obtained above this temperature.

More suitable methods of preparation are being developed by Cannon and Shapiro of the Chemistry Division.

307-X29P - Neutron Diffraction - (Floyd, Hasbrouck, Ulrich)

Instrument development has claimed the principle attention of the group. An apparatus of greater efficiency and higher resolution is being constructed.